

### Supplementary Figure 3.





119579650|Homsap|Metazoa -PSEIF... 50 60 70 80 90 100 110 120 130 140 150 160

50753649|Galgal|Metazoa -PSDIF...  
109129238|Maomul|Metazoa -PSEIF...  
224064131|Taegut|Metazoa -PSNIF...  
73957412|Canlup|Metazoa -PSEIF...  
197098086|Ponabe|Metazoa -PSEIF...  
195121712|Dromoj|Metazoa -LQKPL...  
194208779|Equcab|Metazoa -LSEIF...  
126305175|Mondom|Metazoa -LNDVF...  
149640714|Ornana|Metazoa -SDDIF...  
119910252|Bostau|Metazoa -PSEIF...  
157818599|Ratnor|Metazoa -PAESF...  
47087401|Danrer|Metazoa -FNVVL...  
195029559|Drogri|Metazoa -LQEPF...  
31981920|Musmus|Metazoa -SOHLP...  
158294159|Anogam|Metazoa -LDLYL...  
195436461|Drowl|Metazoa -QKQNH...  
195383788|Drovir|Metazoa -LQEPF...  
195153363|Droper|Metazoa -REQPL...  
125811195|Drosep|Metazoa -REQPL...  
157114165|Aeadaeg|Metazoa -LEVEA...  
17137638|Dromel|Metazoa -PDQAL...  
241999224|Ixosca|Metazoa -FKRGC...  
1947755743|Droana|Metazoa -RDQPL...  
170052241|Culqul|Metazoa -LEVEF...  
198416583|Cioint|Metazoa -LIF...  
193662179|Acypis|Metazoa -ANIMY...  
195584389|Drosim|Metazoa -PDQAL...  
195335398|Drosec|Metazoa -PDQAL...  
156394270|Nemvec|Metazoa -LELLE...  
195487715|Droyak|Metazoa -PDQAL...  
242014593|Pechum|Metazoa -ETEMF...  
194880879|Droere|Metazoa -PDQAL...  
110755491|Apimel|Metazoa -EPTMF...  
19382624|Acypis|Metazoa -PDML...  
91092061|Tricas|Metazoa -E...  
156548314|Navsit|Metazoa -PASLF...  
115656140|Strpur|Metazoa -DODKIF...  
195999168|Triadh|Metazoa -L...  
251444871|Caeale|Metazoa -L...  
157776902|Caebri|Metazoa -L...  
170586496|Brumal|Metazoa -L...  
219459199|Braaflo|Metazoa -L...  
221123226|Hydmag|Metazoa -L...  
167518245|Monbrei|Choanoflagell -L...  
159487565|Chlirei|Viridiplantae -L...  
209879978|Crymur|Alveolata -L...  
239870608|Permar|Alveolata -L...  
156082982|Babbov|Alveolata -L...  
221502672|Toxgon|Alveolata -L...  
239899696|Permar|Alveolata -L...  
66362924|Crypar|Alveolata -L...  
71027093|Thepar|Alveolata -L...  
85000303|Theann|Alveolata -L...  
68074343|Plaber|Alveolata -L...  
124505747|Plafal|Alveolata -L...  
221052352|Plakno|Alveolata -L...  
156095075|Plaviv|Alveolata -L...  
229892013|Afrswi|dsDNA|Viruses -L...  
55819381|Acpool|dsDNA|Viruses -L...



	230	240	250	260	270	280	290
119579650 Homsap Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
50753649 Galgal Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
109129238 Maemul Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
224064131 Taegut Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
73957412 Canlup Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
197098086 Ponabe Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195121712 Dromoj Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
194208779 Equcab Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
126305175 Mondom Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
149640714 Ornana Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
119910252 Bostau Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
157818599 Ratnor Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
47087401 Danrer Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195029559 Drogri Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
31981920 Musmus Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
158294159 Anogam Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195436461 Drowil Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195383788 Drovir Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195153363 Droper Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
125811195 Dropee Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
157114165 Aedaeg Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
17137638 Dromel Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
241999224 Ixosca Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
194755743 Droana Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
170052241 Culqul Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
198416583 Cioint Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
193662179 Acypis Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195584389 Drosin Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195335398 Drosec Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
156394270 Nemvec Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195487715 Droyak Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
242014593 Pechum Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
194880879 Droere Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
110755491 Apimel Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
193582624 Acypis Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
91092006 Tricas Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
156548314 Nasvit Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
115656140 Strpur Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
195999168 Triadh Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
25144487 Caeale Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
157776902 Caebrl Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
170586496 Brumal Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
219459199 Braflo Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
221123226 Blydmag Metazoa	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
167518245 Monbrei Choanoflagell	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
159487565 Chlirei Viridiplantae	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
209879978 Crymur Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
239870608 Permar Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
156082982 Babbov Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
221502672 Toxgon Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
239899696 Permar Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
66362924 Crypar Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
71027093 Thepar Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
85000303 Theann Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
68074343 Plaber Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
124505747 Plafal Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
221052352 Plakno Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
156095075 Plaviv Alveolata	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
229892013 Afrswi dsDNA Viruses	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		
55819381 Acapoi dsDNA Viruses	TVHLVTAAGSFFQ	QVGGFVVKMF	LVFPHCS	IMLYLL	CGDFVH		



400 410 420 430 440 450 460 470 480 490

119579650|Homsap|Metazoa DCAVQVEF...  
50753649|Galgal|Metazoa DCAVQVEF...  
109129238|Macmul|Metazoa DCAVQVEF...  
224064131|Taegut|Metazoa DCAVQVEF...  
73957412|Canlup|Metazoa DCAVQVEF...  
197098086|Ponabe|Metazoa DCAVQVEF...  
195121712|Dromoj|Metazoa GVVESMVF...  
194208779|Egucab|Metazoa DCAVQVEF...  
126305175|Mondom|Metazoa DCAVQVEF...  
149640714|Ornana|Metazoa DCAVQVEF...  
119910252|Bostau|Metazoa DCAVQVEF...  
157818599|Ratnor|Metazoa NCAVQVEF...  
47087401|Danrer|Metazoa EYVADVEF...  
195029559|Drogri|Metazoa GVVESMVF...  
31981920|Musmus|Metazoa DCAVQVEF...  
158294159|Anogam|Metazoa QVTELEEF...  
195436461|Drowil|Metazoa GVVESMVF...  
195383788|Drovir|Metazoa GVVESMVF...  
195153363|Droper|Metazoa GVVESMVF...  
125811195|Drosep|Metazoa GVVESMVF...  
157114165|Aeadaeg|Metazoa KMKRRERF...  
17137638|Dromel|Metazoa SILVANNVF...  
241999224|Ixosca|Metazoa EYVADVEF...  
194755743|Droana|Metazoa GVVESMVF...  
170052241|Culqul|Metazoa SQMRRERF...  
198416583|Cioint|Metazoa EQVQKQVF...  
193662179|Acypis|Metazoa ASMQQVF...  
195584389|Drosim|Metazoa SILVANNVF...  
195353398|Drosec|Metazoa SILVANNVF...  
156394270|Nemvec|Metazoa KQAVYVF...  
195487715|Droyak|Metazoa GVVESMVF...  
242014593|Pechum|Metazoa YALADEVF...  
194880879|Droere|Metazoa GVVESMVF...  
110755491|Apimel|Metazoa CHVADKVF...  
193582624|Acypis|Metazoa YVWAKQVF...  
910920061|Nasica|Metazoa VVYANNVF...  
156548314|Nasvit|Metazoa KUVADKVF...  
115656140|Strpur|Metazoa ACQVNEVF...  
195999168|Triadh|Metazoa KAIKAEVF...  
251444871|Caeale|Metazoa SFELKTKVF...  
157776902|Caebrl|Metazoa RFMEQKVF...  
170586496|Brumal|Metazoa IQQAVYVF...  
219459199|Braaflo|Metazoa EOCARQVF...  
221232266|Hydnag|Metazoa HYYAKQVF...  
167518245|Monbre|Choanoflagell RYVADKVF...  
159487565|Chirel|Viridiplantae RYVADKVF...  
209879978|Crymar|Alveolata RYVADKVF...  
239870608|Pernar|Alveolata RYVADKVF...  
156082982|Babbov|Alveolata RYVADKVF...  
221502672|Toxgon|Alveolata RYVADKVF...  
239899696|Pernar|Alveolata RYVADKVF...  
66362924|Crypar|Alveolata RYVADKVF...  
71027093|Thepar|Alveolata RYVADKVF...  
8500303|Theann|Alveolata RYVADKVF...  
68074343|Plaber|Alveolata RYVADKVF...  
124505747|Plafal|Alveolata RYVADKVF...  
221052352|Plakno|Alveolata RYVADKVF...  
156095075|Plaviv|Alveolata RYVADKVF...  
229892013|Afrsivi|dsDNA|Viruses IKLLNDVF...  
55819381|Acpool|dsDNA|Viruses SEYYDVF...



119579650 Homsap Metazoa	-----	E
50753649 Galgal Metazoa	-----	D
109129238 Macmul Metazoa	-----	E
224064131 Taegut Metazoa	-----	K
73957412 Canlup Metazoa	-----	E
197098086 Ponabe Metazoa	-----	E
195121712 Dromo Metazoa	-----	-
194208779 Equcab Metazoa	-----	E
126305175 Mondom Metazoa	-----	E
149640714 Ornana Metazoa	-----	E
119910252 Bostau Metazoa	-----	E
157818599 Ratnor Metazoa	-----	E
47087401 Danrer Metazoa	-----	E
195029559 Drogri Metazoa	-----	E
31981920 Musmus Metazoa	-----	E
158294159 Anogam Metazoa	-----	-
195436461 Drowl Metazoa	-----	-
195383788 Drovir Metazoa	-----	-
195153363 Droper Metazoa	-----	-
125811195 Drope Metazoa	-----	-
157114165 Aedaeg Metazoa	-----	-
17137638 Dromel Metazoa	-----	-
241999224 Ixosca Metazoa	-----	-
194755743 Droana Metazoa	-----	-
170052241 Culqul Metazoa	-----	-
198416583 Cioimt Metazoa	-----	-VF
193662179 Acypis Metazoa	-----	-
195584389 Drosim Metazoa	-----	-
195335398 Drosec Metazoa	-----	-
156394270 Nemvec Metazoa	-----	-
195487715 Droyak Metazoa	-----	-
242014593 Pedhum Metazoa	-----	-
194880879 Droere Metazoa	-----	-
110755491 Apimel Metazoa	-----	-
19382624 Acypis Metazoa	-----	-
91092006 Tricas Metazoa	-----	-
156548314 Nasvit Metazoa	-----	-
115656140 Strpur Metazoa	GGQRSTYNEETECRSSEIFVQIPWITPKHDLDSLGSWKIVTGHFVRAVFMSPFCQMLLDKWRSVR-----	-TNAQVLQOSTGHNVKHPQCDSLSPQ
195999168 Triadh Metazoa	-----	QEQ
25144487 Caele Metazoa	-----	-
157776902 Caebr Metazoa	-----	-
170586496 Brumal Metazoa	-----	-
219459199 Braflo Metazoa	-----	D
221123226 Hydmag Metazoa	-----	-
167518245 Monbre Choanoflagell	-----	-
159487565 Chlrei Viridiplantae	-----	-
209879978 Crymur Alveolata	-----	-
239870608 Permar Alveolata	-----	-
156082982 Babbov Alveolata	-----	-
221502672 Toxgon Alveolata	-----	-
239899696 Permar Alveolata	-----	-
66362924 Crypar Alveolata	-----	-
71027093 Thepar Alveolata	-----	-
8500303 Theann Alveolata	-----	-
68074343 Plaber Alveolata	-----	-
124505747 Plafal Alveolata	-----	-
221052352 Plakno Alveolata	-----	-
156095075 Plaviv Alveolata	-----	-
229892013 Afrswi dsDNA Viruses	-----	-
55819381 Acapoi dsDNA Viruses	-----	-

	530	540	550	560	570	580	590	600	610	620	630	640		650																																			
119579650 Homsap Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		TLRNIK-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																			
50753649 Galgal Metazoa	ELW-RRPKRRLQL	---CHSCEVLP	EQILA	VDLSQSYQ	EVINCR	EDKRFKLV	SLSDTE	-GQPMELIKC	DATLTF	FSFLHYD	PKYQOQL	DOCHLSLRLH	HTCD	AL	VPLVLSQFRRM																																		
109129238 Macmul Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		TSNHIK-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																			
224064131 Taegut Metazoa	ELGGERLKSMLQS	---CQSCVLP	EELILAKV	DLRSCHQ	EAINECS	DRFKLVW	TLCNTK	-SQPMELIKC	DAMLLTF	FSFLHYD	PKYQOQL	DOCHLSLRLH	HTCD	AL	VPLVLSQFRRM																																		
73957412 Canlup Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		TLRNIK-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																			
197098086 Ponabe Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		TLRNIK-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																			
195121712 Dromoj Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS																																												
194208779 Egucab Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		TRSDQ	-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																		
126305175 Mondom Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		PPDD-K	-IYHMEVSL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																		
149640714 Ornana Metazoa	KSFIDASSLGRK	PPPP---CR	SCRVLG	DLVPS	ELLNLT	PSLDDSS	EGTAR	IKCVW	GLP																																								
119910252 Bostau Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		ALHNK	-MHIPLEVRL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																		
157818599 Ratnor Metazoa	KSSGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		IVRDQ	-MYTALVQL	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																		
47087401 Danrer Metazoa	CNL-RVKIVNWSLKALPT	-CSSCSSD	SPVSL	SEICSS			SWCDK	LTQVRIQ	EEI	QPSYCV	QVNVV	ED	QD	YQLE	LN	NV	TA	LQ	KOD	QSS																													
195029559 Drogri Metazoa																																																	
31981920 Musmus Metazoa	KSLGGALNLDKFRPKQYSCSCHVFS	EELIFSELCSIT	ECIQDEQVVEP	SNQIKCLVW	GFSS		AVCDLQ	-MPAPLEIQ	ESLELTFSCSLHDP	DTYQRLD	DOCHLSLRLH	HTCD		VM	VPLVLSQFRRM																																		
158294159 Anogam Metazoa																																																	
195436461 Drowl1 Metazoa																																																	
195383788 Drovir Metazoa																																																	
195153363 Droper Metazoa																																																	
125811195 Dropei Metazoa																																																	
157114165 Aedae Metazoa																																																	
17137638 Drome1 Metazoa																																																	
241999224 Ixosca Metazoa																																																	
194755743 Droana Metazoa																																																	
170052241 Culqul Metazoa																																																	
198416583 Cioint Metazoa	HDSGEMSDSTHFDSE	SNLSLNLVLEED	QRIT	Q	HNH	VLE	EP	CS	SV	YS	EW	SK	LE	KN																																			
193662179 Acypis Metazoa																																																	
195584389 Drosim Metazoa																																																	
195335398 Drosec Metazoa																																																	
156394270 Nemvec Metazoa																																																	
195487715 Droyak Metazoa																																																	
242014593 Pechum Metazoa																																																	
194880879 Droere Metazoa																																																	
110755491 Apimel Metazoa																																																	
19385824 Acypis Metazoa																																																	
91092006 Tricac Metazoa																																																	
156548314 Nasvit Metazoa																																																	
115656140 Strpur Metazoa	IYEVIE	GLLSKRPV	SSCOEBS	WCCS	GVNK	QELD	LLDQ	L	ASTH	NV	IKS	CRD	NNR	EM	FD																																		
195999168 Triadh Metazoa	SRHKQIK	ITDYNH	SLPT	FYSNS	CYKS	IADILL	SVTK	CNQ	KYVLS	GRV	QH	SNL	CN	QSG	VSD	Q	VK	VIT	TS	N	S	A	P	C	T	Y	F	A	S	S	T	S	S	E	L	S	S	F	D	S	C	V	E	R	I	Q	E	F	K
25144487 Caeale Metazoa																																																	
157776902 Caebri Metazoa																																																	
170586496 Brumal Metazoa																																																	
219459199 Brafla Metazoa																																																	
221123226 Hydmag Metazoa																																																	
167518245 Monbre Choanoflagell																																																	
159487565 Chirei Viridiplantae																																																	
209879978 Crymur Alveolata																																																	
239870608 Permar Alveolata																																																	
156082982 Babbov Alveolata																																																	
221502672 Toxgon Alveolata	VSHLDLLE	FERG	TKS	ELI	QKFT	SKLS	AVGL	VYD	V	TRLE	Q	T	D	S	H	A	S	O	R	T	E	F	F	S																									
239899696 Permar Alveolata																																																	
66362924 Crypar Alveolata																																																	
71027093 Thepar Alveolata																																																	
85000303 Theann Alveolata																																																	
68074343 Plaber Alveolata																																																	
124505747 Plafal Alveolata																																																	
221052352 Plakno Alveolata																																																	
156095075 Plaviv Alveolata																																																	
229892013 Afrswi dsDNA Viruses																																																	
55819381 Acapoi dsDNA Viruses																																																	

660 670 680 690 700 710 720 730 740 750 760 770

119579650|Homsap|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

50753649|Galgal|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

109129238|Maomul|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

224064311|Taegut|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

73957412|Canlup|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

197098086|Ponabe|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195121712|Dromoj|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

194208779|Equcab|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

126305175|Mondom|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

149640714|Ornana|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

119910252|Bostau|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

157818599|Ratnor|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

47087401|Danrer|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195029559|Drogri|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

31981920|Mumus|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

158294159|Anogam|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195436461|Drowil|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195383788|Drovir|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195153363|Droper|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

125811195|Dropej|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

157114165|Aeadae|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

17137638|Dromel|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

241999224|Ixosca|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

194755473|Droana|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

170052241|Culqil|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

198416583|Cioint|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

193662179|Acypis|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195584389|Drosim|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195335398|Drosec|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

156394270|Nemvec|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195487715|Droyak|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

242014593|Pechum|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

194880879|Droere|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

110755491|Apimel|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

19382624|Acypis|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

19102006|Tricas|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

156548314|Nasvit|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

115656140|Strpur|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

195999168|Triadh|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

25144487|Caeale|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

157776902|Caecri|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

170586496|Brumal|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

219459199|Brafilo|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

22123226|Hydnag|Metazoa -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

167518245|Monbre|Choanoflagell -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

159487565|Chlirei|Viridiplantae -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

209879978|Crymur|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

239870608|Permar|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

156082982|Babbov|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

221502672|Toxgon|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

239899696|Permar|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

66362924|Crypar|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

71027093|Thepar|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

85000303|Theann|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

68074343|Plaber|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

124505747|Plafal|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

221052352|Plakno|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

156095075|Plaviv|Alveolata -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

22982013|Afrswi|dsDNA|Viruses -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

5819381|Acapol|dsDNA|Viruses -A-LVFLVH-HSCRFHIFVC-PTSDDLRCICAVLVCVQDLNPNVFRY-**Q**HNLSLSTLLNSDFQO-VLQVFMVEV-LKALLDSDWLNMT-KRHLHVIQREEREIINSLQGN-

